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# Variations and Trends in State Nursing Facility Capacity: 1978-93

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*The demand for nursing facility (NF) beds has been growing with the aging of the population and many other factors. As the need for nursing home care grows, the Nation's capacity to provide such care is the subject of increasing concern. This article examines licensed NFs and beds, presenting data on trends from 1978-93. Measures of the adequacy of NF beds in States are examined over time, including the ratio of beds per aged population, occupancy rates, and State official's opinions of the adequacy of supply. State and regional variations are shown over time, and we speculate on the factors which may be associated with the variation.*

## INTRODUCTION

NF services accounted for approximately \$70 billion (8 percent) of total health care expenditures in the United States in 1993 (Levit et al., 1994). The increase in NF expenditures was 6.3 percent from 1992 to 1993. These increases in costs are particularly troublesome to the Medicaid program, which paid for 52 percent of the Nation's NF expenditures in 1993. Other government sources pay 11 percent of the costs. The large State and Federal NF expenditures have drawn the attention of policymakers and researchers to supply and demand factors for NF services.

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## BACKGROUND

### Demand

The demand for NF services is growing with the increasing numbers of individuals who are aged and chronically ill. In 1990, there were about 32 million Americans 65 years of age or over; this number is projected to increase to 64 million in 2030 (Zedlewski and McBride, 1992). As the population ages and develops chronic illnesses, the need for long-term care (LTC) services, including NF services, increases. The total risk for becoming a nursing home patient after 65 years of age is 43 percent, peaking at 75-80 years of age (Murtaugh, Kemper, and Spillman, 1990). The number of elderly needing NF care is expected to increase from about 1.8 million in 1990 to 4.3-5.3 million in 2030, depending on the projection assumptions (Zedlewski and McBride, 1992; Mendelson and Schwartz, 1993). The number of aged and level of demand for LTC services vary across States.

Several Federal policy changes during the 1980s contributed to an increase in NF demand and government expenditures for NF services. The adoption of the prospective payment system (PPS) for inpatient hospital stays by Medicare in 1983 resulted in shortened hospital stays and increased the number of referrals and admissions to NFs (Guterman et al., 1988; Neu and Harrison, 1988; U.S. House of Representatives, 1990; Latta and Keene, 1989). In April 1988, HCFA issued new Medicare clarifying guidelines regarding the administration of Medicare NF payments which expanded coverage (U.S.

House of Representatives, 1990). The 1988 Medicare Catastrophic Coverage Act also expanded Medicare nursing home coverage, but was repealed in 1989, with no overall increase. Additional 1988 legislation established a minimum level of asset and income protection for spouses when determining Medicaid NF eligibility, also contributing to an increase in Medicaid program costs (Letsch et al., 1992). These policy changes have all encouraged the demand for NF services, thereby increasing the costs of Medicaid and Medicare.

States have adopted policies to control Medicaid NF demand, including Medicaid eligibility policies and preadmission screening programs (PAS) (Health Care Financing Administration, 1992a, 1992b; Ellwood and Burwell, 1990; Harrington, Curtis, and DuNah, 1994b). These policies may have had a constraining effect on demand and, consequently, the growth in NF capacity.

Alternatives to or substitutes for nursing home care are expanding rapidly, which may reduce the demand for such care. The number of home health agencies, the volume of home health care services, and Medicare coverage for such services have dramatically increased during the last 5 years (Letsch et al., 1992; National Association for Home Care, 1992). In addition, States have attempted to expand alternatives to institutional care under the Medicaid home and community-based waiver programs established in 1981. Several legislative changes have further expanded Medicaid waivers (Health Care Financing Administration, 1992a; Gurney, Hirsch, and Gondek, 1992). These programs have increased the utilization of home and community-based services to meet the demand for long-term care (Justice, 1988; Miller, 1992; Lipson and Laudicina, 1991; Folkemer, 1994).

## Supply

The capacity of NFs to meet the demand for services has been strained during the past decade. Previous studies have shown that growth has failed to meet the demand in some areas (Feder and Scanlon, 1980; Scanlon, 1980a, 1980b; Nyman, 1985, 1989a, 1989b; Bishop, 1988). There are substantial variations in State capacity; some States may even have an oversupply of NF beds (Swan and Harrington, 1986; Wallace, 1986; Harrington et al., 1992; Swan et al., 1993b).

State Medicaid programs have undertaken a number of policy initiatives to control supply and reduce NF spending. This began in the early 1980s, when Federal budget cuts to State Medicaid programs became standard features of the budget process (Bishop, 1988). The two most important policies affecting the supply of LTC bed supply are State certificate-of-need (CON) programs and State Medicaid reimbursement rates.

The health planning and CON program established in 1974 (Public Law 94-641) gave States considerable authority and discretion to plan and control capital expenditures for NFs and other health facilities (Kosciesza, 1987). The effectiveness of CON policies in controlling bed supply has been widely debated, and the policies opposed by many providers (Cohodes, 1982; Friedman, 1982; Swan and Harrington, 1990; Mendelson and Arnold, 1993). These controversies resulted in the Federal repeal of the program in 1986 (Kosciesza, 1987). Even after the Federal repeal of the program, 44 States continued to use CON and/or moratorium policies to regulate the growth in nursing homes (Harrington, Curtis, and DuNah, 1994a).

Many State Medicaid programs have made efforts to control the growth in NF reimbursement rates (Swan, Harrington,

and Grant, 1993; Swan et al., 1993a; Holahan and Cohen, 1987; Bishop, 1988; Nyman, 1988; Holahan et al., 1993). State variations in reimbursement methods and rates create major differences in facility revenues which can in turn impact the financial viability of LTC facilities and the quality of care (Nyman, 1989a). Medicaid spending on NFs and intermediate care facilities for the mentally retarded (ICFs/MR) has declined from 39 percent in 1980 to 31 percent (of \$112.8 billion) in 1993 as a proportion of total Medicaid spending (Levit et al., 1994; Letsch et al., 1992).

## Market Effects

Medicaid NF days of care accounted for a major proportion of all patient days in facilities (estimated to be 73 percent of days in 1991 [HCIA, Inc. and Arthur Andersen & Company, 1994]). Nevertheless, most nursing homes prefer private clients because facilities can generally charge private-paying residents higher daily rates than Medicaid (Phillips and Hawes, 1988). NFs also tend to prefer those patients who are the least sick or for whom they can provide the most cost-efficient care (except in States where Medicaid case-mix-reimbursement methods encourage the admission of individuals with greater disabilities). When nursing homes are selective in their admission policies, access to those individuals with the greatest need may be limited. Where the supply of NF beds is limited, problems in gaining access to needed services may be exacerbated (Falcone et al., 1991; Kenney and Holahan, 1990).

## METHODOLOGY

The primary data on licensed NFs and beds for this study were collected directly from State officials by the authors. The State officials contacted were those with

data on licensed NFs. Generally, data came directly from the licensing and certification program of the State, but some States reported data from an office of research and health statistics or an LTC office. Since each State has its own organizational structure for collecting and maintaining these data, the initial surveys involved making a number of calls to each State in order to identify the appropriate contact office. These data were collected in a series of separate State telephone surveys in 1983, 1986, 1989, 1992, and 1993.

The State surveys conducted for this study were designed to include all State-licensed NFs and beds in both freestanding and hospital facilities and to eliminate any duplicate counting of beds. Facilities licensed as residential care (or board and care) were not included in this study, nor were any ICFs/MR (Hawes, Wildfire, and Lux, 1993; Lakin et al., 1993; Harrington et al., 1994). Swing beds licensed as acute-care beds were also not included (Dubay, 1993). Because each State has developed its own licensing requirements, minimum State requirements vary, but Federal NF certification requirements are uniform across States. This survey does not examine the specific components of State licensing requirements, but the survey identifies the licensed NF capacity in States. Facility beds must be licensed by States in order to be eligible to be certified for Medicare or Medicaid residents.

Historically, the Federal certification requirements made a distinction between skilled nursing facilities (SNFs) and intermediate care facilities (ICFs); most State licensing requirements also made a distinction between these two types. Because the categories for SNF and ICF licenses were not uniform across States, the Omnibus Budget Reconciliation Act of 1987 National Nursing Home Reform legislation removed the distinctions between

SNFs and ICFs. This legislation was implemented in 1990. Thus, the data presented here show all licensed nursing homes combined into one category, NFs. Some States make distinctions in the level of care for residents within facilities and may continue to use the terms SNF and ICF to describe categories of residents.

This article updates earlier published studies on State data presented for the 1978-88 period, and makes corrections in those data where reports were changed by States (Harrington et al., 1992). Data were collected by telephone in all four surveys using a structured questionnaire that requested specific data on the number, types, level, and certification status of facilities and beds, as well as occupancy rates. State officials from the principal State agency responsible for data were asked to report on NFs and beds for December of each calendar year. Where possible, State officials were asked to send actual reports and data on beds and facilities so that data could be verified. All States and the District of Columbia voluntarily participated in the study by providing data. State-reported data could not be verified independently in this study; by necessity, the authors have depended on official data and reports from States.

## **FINDINGS**

### **Total Nursing Facilities and Growth Rates**

The total number of combined NFs (both freestanding and hospital-based) is shown in Table 1. The number of NFs in the Nation increased from 14,264 (1978) to 16,959 (1993), an increase of 19 percent. From 1978 to 1993, most States had increases in facilities, especially Arizona, Delaware, and New Mexico; only 8 States had reductions in facilities. Rather than increasing the number of

NFs in a State, facilities increased their average number of beds. The national average number of beds per facility increased from 92 beds in 1978 to 102 beds in 1993, which amounts to an 11-percent increase in facility size during the 16-year period. The Northeast Region had the highest average bed size and the West the lowest.

### **Nursing Facility Beds and Growth Rates**

The total number of beds increased from 1.3 million in 1978 to 1.74 million in 1993, a 33-percent increase during the 16-period (Table 1). Six large States have 37 percent of the total NF beds in the United States (California, Illinois, New York, Ohio, Pennsylvania, and Texas).

Certain States had a particularly large amount of bed growth from 1978 to 1993, with the highest rate in Arizona (207 percent). Other States, such as Wisconsin and Colorado, had little or negative bed growth during this period. The growth rates varied by census region. Total NF bed growth was 53 percent in the South, 32 percent in the Northeast, 23 percent in the North Central Region, and only 20 percent in the West. Thus, the growth in the South was more than two times greater than in the North Central and the West.

### **Adequacy of Nursing Home Bed Supply**

One difficult issue is how to determine the adequacy of the existing NF bed capacity. Four measures of the adequacy of NF bed supply are discussed here: bed ratios per population 65 years of age or over; bed ratios per population 85 years of age or over; occupancy rates; and the opinion of State officials about the adequacy of supply. These three objective and one subjective measures show relationships across States

and regions in comparison to the means, but the measures are unable to suggest the ideal capacity in a State or region.

### ***Bed Ratios per Population 65 Years of Age or Over***

The U.S. population has been aging rapidly. The total number of persons 65 years of age or over grew from 11 percent of the population in 1978 to 12.7 percent in 1993. One key concern is whether the growth in beds is keeping pace with the aging of the population. Table 2 shows that the average bed ratio for the United States was 53.4 beds per 1,000 persons 65 years of age or over in 1978. The ratio was 53.0 beds in 1993; thus, the U.S. ratio has remained essentially flat during the last 16 years.

The ratio of beds in 1993 varied from a high of 84 beds per 1,000 persons 65 years of age or over in Kansas to a low of 26 beds in Hawaii. The ratio is highest in the North Central Region (69 per 1,000 in 1993). The Northeast and Southern States were about average. The West was well below the national average in terms of bed to population ratios (40 beds per 1,000).

### ***Bed Ratios per Population 85 Years of Age or Over***

The percent of the U.S. population 85 years of age or over, the population most at risk for NF services, increased 40 percent from 1978-93. Table 2 shows that the average number of beds dropped from 610 per 1,000 persons 85 years of age or over in 1978 to 491 in 1993 (a 19.6-percent decline). The trend was downward for every year during the period. Only 10 States and the District of Columbia increased the number of beds per population 85 years of age or over during the 16-year period. Some observers would argue that the trends in State bed ratios would be

expected to regress to the U.S. mean ratio over time. This appeared to occur for those States with above average bed ratios: 26 States with above average bed ratios in 1978 declined toward the mean ratio for the 85 years of age or over population in 1993, compared with only 1 State which increased its ratio. For the States with below average bed ratios in 1978, 10 increased toward the mean and 14 continued to decline below the mean in 1993. The States with the largest declines were in the West (a 21-percent decline). Thus, the regression to the mean may have occurred for States with higher-than-average ratios, but a majority of States with low ratios continued to decline.

Variation across States and regions for persons 85 years of age or over were similar to those for the population 65 years of age or over (Pearson correlation was 0.93 between the two ratios,  $p < 0.0001$ ). The North Central Region had the highest ratio (597 beds per 1,000 population 85 years of age or over) and the West had the lowest (395 beds) in 1993. Population growth among those 85 years of age or over was fastest in the South (89 percent from 1978-93) and West (73 percent), so that the growth in beds did not keep pace with the population growth in those regions. Thus, the beds per 85 years of age or over population declined the most in the West (31 percent), the South (19 percent), and the North Central Regions (18 percent).

### ***Occupancy Rates***

In 1978, the average NF occupancy rate for the 25 reporting States was 90.3 percent. Average occupancy rates for the United States gradually increased to a high of 92.8 percent in 1984, then declined to 91 percent in 1992 and 1993. Although NF occupancy rates were generally high, States did show a wide range in rates. The

**Table 1**  
**Total Number of Licensed Nursing Home Beds and Facilities, by State and Census Region: 1978-93**

State and Census Region	Beds					Facilities					Percent Growth 1978-93
	1978	1982	1986	1990	1993	1978	1982	1986	1990	1993	
Total	1,309,223	1,423,488	1,528,341	1,659,651	1,736,415	14,264	14,802	15,304	16,367	16,959	18.9
Alabama	19,879	21,306	21,970	22,555	23,363	189	192	214	217	224	18.5
Alaska	923	839	928	1,016	1,033	18	18	19	21	22	22.2
Arizona	5,354	7,148	13,761	16,051	16,444	67	75	124	136	148	120.9
Arkansas	18,548	19,981	22,115	22,533	24,306	210	218	252	247	237	12.9
California	110,826	112,922	115,803	123,870	128,411	1,256	1,252	1,223	1,252	1,397	11.2
Colorado	20,066	18,203	18,109	20,115	20,019	184	182	192	210	226	22.8
Connecticut	24,169	26,221	27,628	29,172	31,308	293	287	303	332	347	18.4
Delaware	2,762	3,508	3,906	4,465	5,552	27	36	43	46	57	111.1
District of Columbia	1,881	1,973	2,849	3,054	3,195	12	15	17	19	19	58.3
Florida	34,939	41,578	51,863	64,472	72,714	333	378	456	559	612	83.8
Georgia	30,588	34,780	34,742	37,148	39,145	358	358	345	351	361	0.8
Hawaii	2,381	2,629	2,953	3,401	3,497	32	34	33	40	43	34.4
Idaho	4,454	4,690	4,910	5,561	5,916	60	64	64	71	78	30.0
Illinois	87,262	89,699	92,874	97,655	103,501	759	746	735	836	846	11.5
Indiana	41,578	50,414	51,893	58,482	59,683	492	504	528	572	589	19.7
Iowa	30,369	32,098	33,296	32,737	35,708	408	430	455	460	479	17.4
Kansas	25,910	26,263	27,105	30,383	29,783	381	385	390	427	444	13.6
Kentucky	16,167	18,487	20,439	22,657	24,586	261	300	233	249	286	9.6
Louisiana	22,541	26,100	33,853	37,277	37,862	235	229	307	317	339	44.3
Maine	8,693	8,919	9,758	9,909	10,129	162	152	165	164	145	-10.5
Maryland	19,322	22,259	23,934	26,899	28,850	175	199	207	224	229	30.9
Massachusetts	43,295	42,868	45,831	51,165	53,479	584	552	529	567	566	-3.1
Michigan	46,026	46,128	48,857	51,496	50,947	447	436	448	453	452	1.1
Minnesota	40,061	42,641	45,024	44,890	44,887	442	438	446	447	445	0.7
Mississippi	11,424	13,793	15,201	15,322	16,251	158	170	176	166	170	9.5
Missouri	35,779	44,450	48,594	55,444	57,321	456	510	547	594	614	34.6
Montana	6,270	6,124	6,531	6,434	6,465	92	97	97	95	195	3.3
Nebraska	18,284	18,325	18,600	19,489	19,513	225	226	228	242	243	8.0
Nevada	2,009	2,256	2,534	3,123	3,623	25	27	32	32	35	40.0
New Hampshire	5,952	6,629	6,732	6,834	7,240	66	71	68	80	78	18.2
New Jersey	29,545	34,381	39,993	47,333	48,720	188	292	290	352	355	88.8
New Mexico	2,910	4,075	5,706	6,468	6,845	38	51	63	84	81	113.2
New York	90,178	94,210	98,747	103,714	110,180	551	586	605	623	646	17.2
North Carolina	17,424	21,869	23,540	27,675	37,801	199	229	251	300	393	97.5
North Dakota	6,599	6,599	6,800	6,942	7,071	87	97	95	92	84	-3.4
Ohio	65,126	74,164	83,991	90,529	90,860	903	942	1,001	969	988	9.4
Oklahoma	26,270	27,664	30,113	33,204	34,457	369	377	385	409	415	12.5
Oregon	14,653	15,221	15,357	15,395	14,811	200	193	192	187	177	-11.5
Pennsylvania	66,673	76,759	84,148	87,885	92,529	633	665	669	694	730	15.3

See footnotes at end of table.

**Table 1—Continued**  
**Total Number of Licensed Nursing Home Beds and Facilities, by State and Census Region: 1978-93**

State and Census Region	Beds						Facilities					
	1978	1982	1986	1990	1993	Percent Growth 1978-93	1978	1982	1986	1990	1993	Percent Growth 1978-93
Rhode Island	8,228	8,851	9,759	9,976	10,463	27.2	112	109	110	106	105	-6.2
South Carolina	9,875	12,462	12,389	14,422	16,211	64.2	109	127	134	152	174	59.6
South Dakota	7,386	7,701	7,851	8,186	8,256	11.8	117	117	115	116	115	-1.7
Tennessee	18,505	26,206	29,708	35,010	36,708	98.4	209	251	274	302	319	52.6
Texas	97,709	101,235	104,160	118,305	122,843	25.7	973	1,000	1,031	1,166	1,242	27.6
Utah	5,758	5,406	6,239	7,175	7,125	23.7	92	86	93	95	100	8.7
Vermont	2,652	2,970	3,367	3,650	3,645	27.8	48	46	48	51	50	4.2
Virginia	16,283	21,477	22,735	28,058	30,738	88.8	163	187	191	251	1282	73.0
Washington	28,225	27,378	26,345	29,059	28,703	1.7	310	304	293	302	289	-6.8
West Virginia	5,451	7,153	8,838	10,186	10,797	98.1	79	92	104	121	127	60.8
Wisconsin	50,542	52,378	53,648	49,871	49,705	-1.7	440	442	453	434	423	-3.9
Wyoming	1,962	2,098	2,314	2,999	3,216	63.9	27	28	31	35	35	29.6
<b>Census Region</b>												
North Central	454,279	490,860	518,533	546,104	557,235	22.7	5,167	5,273	5,441	5,642	5,722	10.7
Northeast	279,585	301,808	325,963	349,638	367,693	31.5	2,637	2,760	2,787	2,969	3,022	14.6
South	369,568	421,831	462,355	523,252	565,379	53.0	4,059	4,358	4,620	5,096	5,489	35.2
West	205,791	208,989	221,490	240,657	246,108	19.6	2,401	2,411	2,456	2,660	2,726	13.5

<sup>1</sup> Number estimated from historical growth.

<sup>2</sup> 1993 number includes a few facilities called residential homes that were licensed nursing homes; previous years did not include these facilities.

<sup>3</sup> Hospital-based nursing home beds are not licensed.

SOURCE: DuNah, R., Harrington, C., Bedney, B., and Carillo, H., University of California, 1994.



Table 2

**Ratio of Licensed Nursing Home Beds per 1,000 Population 65 Years of Age or Over and per 1,000 Population 85 Years of Age or Over, by State and Census Region: 1978-93**

State and Census Region	65 Years of Age or Over					85 Years of Age or Over					Percent Growth 1978-93
	1978	1982	1986	1990	1993	1978	1982	1986	1990	1993	
Total	53.4	53.1	52.7	53.2	53.0	610.3	559.5	537.0	520.3	490.5	-19.6
Alabama	47.3	46.4	44.8	43.2	42.9	597.8	538.2	488.0	430.7	398.2	-33.4
Alaska	92.3	62.9	53.2	45.3	39.2	1426.6	998.8	833.0	677.8	578.7	-59.4
Arizona	19.2	20.9	33.5	33.4	31.1	308.9	305.0	460.4	416.6	350.2	13.4
Arkansas	61.8	62.1	65.6	64.4	67.1	752.7	689.3	689.0	611.3	597.1	-20.7
California	48.2	44.2	40.6	39.6	38.9	534.6	461.8	419.3	405.8	379.0	-29.1
Colorado	84.7	69.2	61.7	60.8	56.0	860.6	677.5	600.8	590.5	521.3	-39.4
Connecticut	69.3	67.7	65.9	65.5	67.8	706.9	652.0	638.3	609.1	595.3	-15.8
Delaware	49.3	55.5	54.3	55.2	63.8	556.0	587.6	571.5	606.6	680.2	22.4
District of Columbia	25.8	26.7	37.2	39.6	41.5	257.2	237.1	303.1	330.7	321.0	24.8
Florida	22.3	22.8	24.9	27.2	28.6	337.7	303.2	305.8	306.7	294.3	-12.9
Georgia	62.7	63.6	57.9	56.8	56.3	830.1	771.3	666.3	606.7	558.0	-32.8
Hawaii	34.0	30.8	28.3	27.3	25.6	478.7	403.7	353.7	323.2	288.9	-39.7
Idaho	50.6	46.4	44.2	45.6	45.6	571.5	505.9	477.2	476.8	438.9	-23.2
Illinois	71.2	68.6	67.6	68.1	70.0	785.0	699.0	661.8	639.4	622.0	-20.8
Indiana	73.3	82.5	79.4	83.9	82.0	807.0	853.4	790.2	806.2	758.2	-6.1
Iowa	79.9	80.5	80.5	76.8	81.9	707.9	655.3	639.7	593.3	612.5	-13.5
Kansas	86.7	83.4	82.3	88.6	84.4	809.4	720.5	677.7	704.2	636.0	-21.4
Kentucky	40.8	43.7	46.1	48.6	51.0	483.7	472.6	470.9	472.5	469.5	-2.9
Louisiana	58.1	63.0	75.8	79.6	77.7	695.9	666.0	741.1	714.0	662.0	-4.9
Maine	63.9	61.0	63.1	60.6	59.5	635.6	553.4	555.1	520.6	490.4	-22.8
Maryland	51.3	52.7	50.8	52.0	52.5	635.9	590.3	554.2	554.8	525.0	-17.4
Massachusetts	61.2	57.1	58.1	62.6	63.5	590.3	507.7	508.3	536.3	520.1	-11.9
Michigan	52.5	48.0	47.3	46.4	43.5	591.7	505.0	494.3	469.4	421.5	-28.8
Minnesota	86.0	85.5	86.1	82.0	79.0	794.0	714.6	696.1	640.9	601.7	-24.2
Mississippi	40.9	46.4	49.1	47.9	49.4	471.1	483.1	475.4	424.2	410.4	-12.9
Missouri	56.5	67.0	70.6	77.3	77.3	601.8	648.0	646.2	665.6	627.0	4.2
Montana	77.4	67.9	66.0	60.3	57.3	721.9	643.8	664.7	596.5	532.4	-26.2
Nebraska	90.5	87.0	85.8	87.3	85.3	809.6	707.6	667.6	663.8	621.6	-23.2
Nevada	34.6	29.6	25.8	24.2	23.4	621.4	500.4	436.2	397.2	359.6	-42.1
New Hampshire	60.7	61.0	57.4	54.6	54.0	646.8	603.3	539.2	492.2	461.1	-28.7
New Jersey	35.6	38.1	41.1	46.0	45.5	419.6	413.3	438.6	473.0	439.1	4.6
New Mexico	27.2	32.5	39.9	39.6	38.5	339.4	387.4	453.1	424.4	388.7	14.5
New York	42.5	42.8	43.3	44.2	46.1	457.2	410.4	397.7	390.2	387.3	-15.3
North Carolina	30.8	33.9	32.5	34.4	43.7	422.7	421.9	383.0	378.4	453.8	7.4
North Dakota	76.4	78.8	77.5	76.1	75.2	730.7	723.2	671.1	610.8	560.5	-23.3
Ohio	57.6	60.6	63.9	64.3	61.4	627.6	614.9	647.9	640.2	586.2	-6.6
Oklahoma	72.0	71.6	74.4	78.3	78.3	822.5	749.3	728.7	707.9	664.9	-19.2
Oregon	50.9	47.2	43.0	39.3	35.4	542.9	478.1	427.3	383.9	328.1	-39.6
Pennsylvania	45.2	47.9	48.8	48.1	48.5	530.5	521.7	523.8	495.0	468.6	-11.7

See footnotes at end of table.

Table 2—Continued

**Ratio of Licensed Nursing Home Beds per 1,000 Population 65 Years of Age or Over and per 1,000 Population 85 Years of Age or Over, by State and Census Region: 1978-93**

State and Census Region	65 Years of Age or Over					85 Years of Age or Over					Percent Growth 1978-93
	1978	1982	1986	1990	1993	1978	1982	1986	1990	1993	
Rhode Island	66.9	66.8	68.6	66.4	67.7	722.8	653.6	664.0	628.2	603.0	-16.6
South Carolina	36.7	40.2	35.2	36.4	38.0	533.2	528.8	449.5	437.4	422.4	-20.8
South Dakota	83.0	82.0	80.0	79.9	78.3	733.2	667.5	623.4	607.1	577.4	-21.3
Tennessee	37.5	48.5	51.2	56.6	56.4	479.7	560.5	553.6	567.2	528.2	10.1
Texas	74.9	70.6	66.6	68.8	66.9	952.4	810.7	718.9	693.8	635.1	-33.3
Utah	55.9	45.6	46.7	47.6	43.2	683.0	539.2	538.8	517.2	438.2	-35.8
Vermont	50.9	49.4	53.4	55.2	52.6	487.2	448.6	467.2	465.0	427.0	-12.4
Virginia	34.0	40.0	37.9	42.2	43.2	420.7	450.7	411.1	447.1	435.9	3.6
Washington	69.2	59.3	50.9	50.4	46.9	719.1	598.2	516.7	508.4	449.1	-37.6
West Virginia	23.7	29.1	34.4	38.0	38.9	285.0	329.3	362.0	381.8	372.6	30.7
Wisconsin	92.7	89.0	86.4	76.5	73.6	955.8	840.4	779.8	662.0	603.6	-36.9
Wyoming	54.5	53.3	54.5	63.4	62.7	573.9	538.4	538.8	626.5	592.9	3.3
<b>Census Region</b>											
North Central	70.0	70.6	70.5	70.4	69.1	729.5	679.9	659.9	636.8	597.4	-18.1
North East	47.4	48.0	49.0	50.2	51.1	516.8	477.7	475.5	470.3	453.6	-12.2
South	45.9	47.2	47.1	48.8	49.8	594.5	552.9	520.7	504.2	481.3	-19.1
West	50.6	45.5	42.7	41.7	39.9	571.7	488.9	454.8	436.5	395.6	-30.8

SOURCE: DuNah, R., Harrington, C., Bedney, B., and Carrillo, H., University of California, 1994.

lowest rates were in Indiana, Missouri, Texas, and Utah (82 percent in 1993) (Table 3). On the other hand, some States had extremely high occupancy rates, such as New York, which reported a 99-percent occupancy rate. Occupancy rates were highest in the Northeastern States (97 percent in 1993), about average in the Southern and North Central States, and lowest in the West (88 percent) in 1993. Of the 31 States reporting in 1993, 13 reported occupancy rates less than the mean and 7 States had rates at 96 percent or greater.

### ***Opinion About the Adequacy of Supply***

Table 3 shows State health planning official's opinions about the adequacy of NF bed supply, rated as under, over, or adequate in 1993. These data were collected from a survey of CON and State health planning officials in each of the States. The opinions of the officials were subjective and no effort was made by the investigators to specify what criteria officials should use in making their own judgment about the adequacy of supply. Based on the opinions of State officials in 1993, 20 States were rated as having an oversupply, 22 were rated as having an adequate supply, 7 were rated as having an undersupply, and 2 had no opinion.

### **Relationship of Adequacy Measures**

Figure 1 shows the ratios of beds per 1,000 persons 85 years of age or over (average of 491 beds, with a standard deviation of 115.0) and the opinions about the adequacy of supply in 1993. For those States considered by officials to have an oversupply, the group-average bed ratio was 550 per 1,000 persons 85 years of age or over, which was higher than the U.S. average (491 beds). For those rated as having an adequate supply, the group-average and U.S.-average bed

ratios were the same. For those States rated as having an undersupply, the group mean (423 beds) was well below the U.S. average, as would be expected.

Figure 2 shows the occupancy rates of NFs (average of 90.8 percent, with a standard deviation of 5.5 percentage points) and the opinions of State officials about the adequacy of supply in 1993. For those States rated by officials as having an oversupply, the group-average occupancy rates (88.1 percent) were below the U.S. occupancy rate, as would be expected. For those States rated as having an adequate supply, the group-average occupancy rate (92 percent) was slightly higher than the U.S. average. For those States rated as having an undersupply, the group average (95.3 percent) was above the U.S. average, as expected.

To illustrate the relationships described, Indiana has a reported oversupply of beds. It had the highest bed ratio to the 85 years of age or over population of any State (758 beds/1,000), the lowest average occupancy rate among the States (82 percent), and an oversupply rating by the State planning office. The bed growth in Indiana from 1978 to 1993 (44 percent) was higher than the national average (33 percent), but the ratio of beds to the 85 years of age or over population declined by 6 percent overall. West Virginia is an example of a State with a reported undersupply of beds. The ratio of beds per person 85 years of age or over was lower than the national average (491 beds per 1,000). Its average occupancy rate was high, at 97 percent, and the State was rated as having an undersupply by the State health planning office. Its bed growth was 98 percent from 1978 to 1993, which was higher than the growth in the aged population in the State. Nevertheless, the ratio of beds to population remained low, because it had the second lowest ratio among the States in 1978 and was not able to make up these historically low bed ratios.

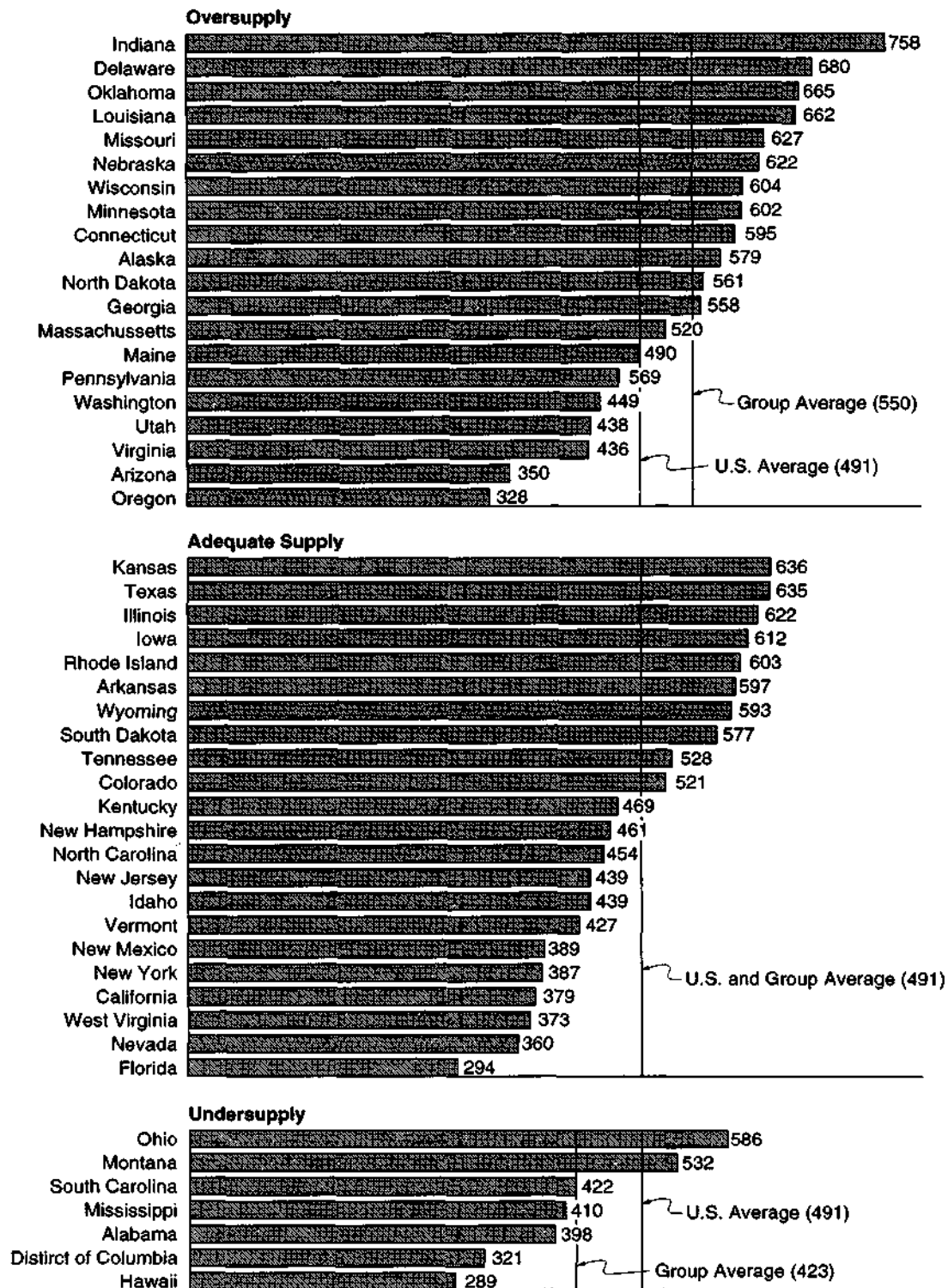
**Table 3**  
**Nursing Home Bed Ratios, Occupancy Rates, and Opinions of Adequacy,**  
**by State and Census Region: 1993**

State	Ratio of Beds per 1,000 Population 85 Years of Age or Over		Occupancy Rate		Opinion of Adequacy
	<i>n</i>	Rank	<i>n</i>	Rank	
Total	490	—	91	—	—
Alabama	398	41	96	8	Undersupply
Alaska	579	18	NA	NA	Oversupply
Arizona	350	47	NA	NA	Oversupply
Arkansas	597	14	NA	NA	Adequate Supply
California	379	44	NA	NA	Adequate Supply
Colorado	521	25	92	14	Adequate Supply
Connecticut	595	15	NA	NA	Oversupply
Delaware	680	2	84	25	Oversupply
District of Columbia	321	49	NA	NA	Undersupply
Florida	294	50	92	13	Adequate Supply
Georgia	558	21	NA	NA	Oversupply
Hawaii	289	51	95	9	Undersupply
Idaho	439	34	89	22	Adequate Supply
Illinois	622	8	NA	NA	Adequate Supply
Indiana	758	1	82	29	Oversupply
Iowa	612	10	NA	NA	Adequate Supply
Kansas	636	5	89	21	Adequate Supply
Kentucky	469	28	98	2	Adequate Supply
Louisiana	662	4	88	23	Oversupply
Maine	490	27	NA	NA	Oversupply
Maryland	525	24	NA	NA	NA
Massachusetts	520	26	96	6	Oversupply
Michigan	421	39	91	18	NA
Minnesota	602	13	95	11	Oversupply
Mississippi	410	40	96	7	Undersupply
Missouri	627	7	82	28	Oversupply
Montana	532	22	NA	NA	Undersupply
Nebraska	622	9	91	17	Oversupply
Nevada	360	46	90	19	Adequate Supply
New Hampshire	461	30	95	11	Adequate Supply
New Jersey	439	33	NA	NA	Adequate Supply
New Mexico	389	42	NA	NA	Adequate Supply
New York	387	43	99	1	Adequate Supply
North Carolina	454	31	NA	NA	Adequate Supply
North Dakota	561	20	97	3	Oversupply
Ohio	586	17	NA	NA	Undersupply
Oklahoma	665	3	83	26	Oversupply
Oregon	328	48	83	27	Oversupply
Pennsylvania	469	29	NA	NA	Oversupply
Rhode Island	603	12	96	5	Adequate Supply
South Carolina	422	38	94	12	Undersupply
South Dakota	577	19	NA	NA	Adequate Supply
Tennessee	528	23	92	16	Adequate Supply
Texas	635	6	82	31	Adequate Supply
Utah	438	35	82	31	Oversupply
Vermont	427	37	NA	NA	Adequate Supply
Virginia	436	36	NA	NA	Oversupply
Washington	449	32	90	20	Oversupply
West Virginia	373	45	97	4	Adequate Supply
Wisconsin	604	11	92	16	Oversupply
Wyoming	593	16	87	24	Adequate Supply
<b>Census Region</b>					
North Central	597	—	90	—	NA
North East	454	—	97	—	NA
South	481	—	91	—	NA
West	396	—	88	—	NA

NOTE: NA is not available.

SOURCE: DuNah, R., Harrington, C., Bedney, B., and Carillo, H., University of California, 1994.

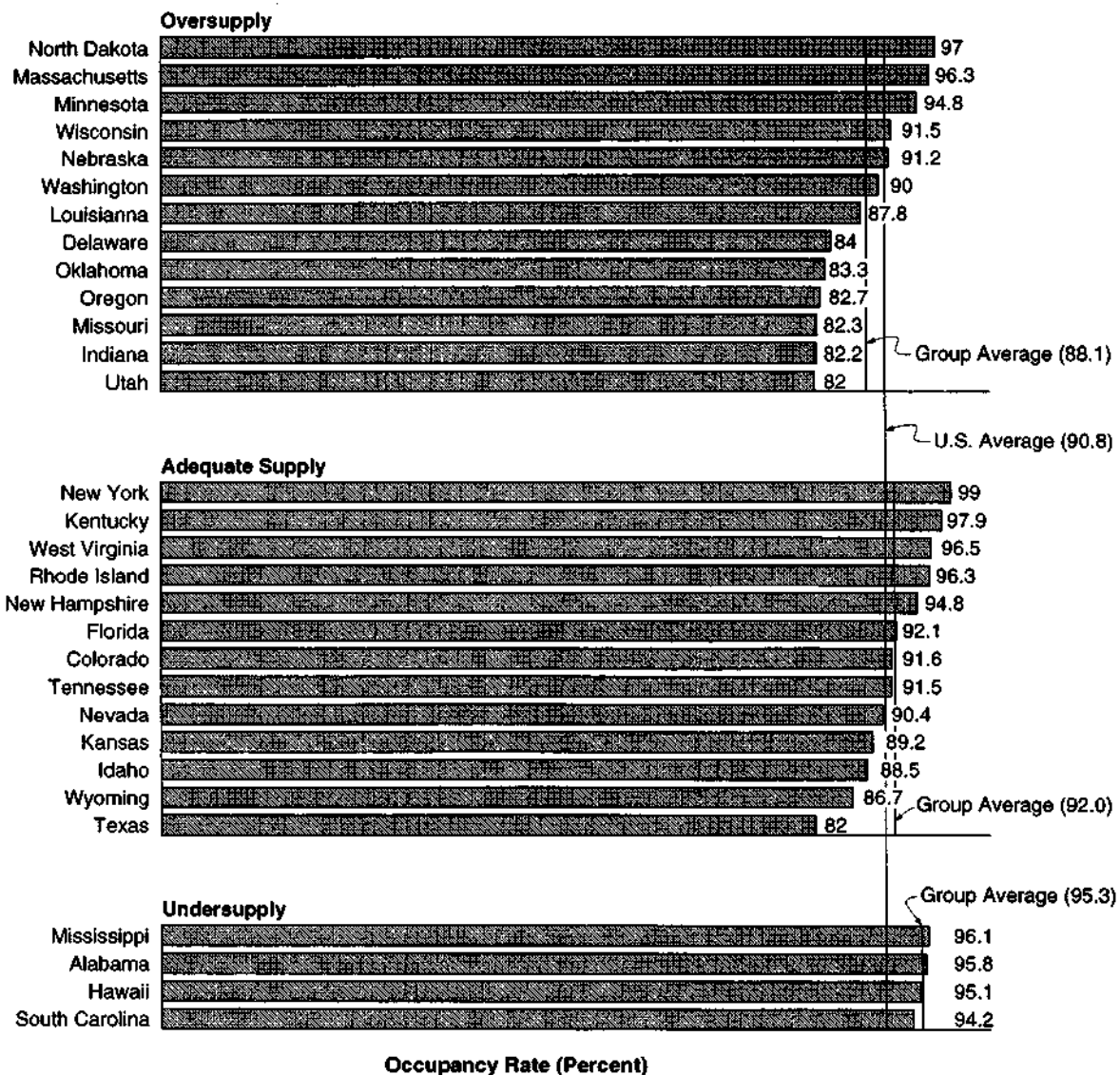
**Figure 1**  
**Nursing Home Beds per 1,000 Population 85 Years of Age or Over, by State Opinion of Adequacy of Supply: 1993**



**Beds per 1,000 Persons 85 Years of Age or Over**

SOURCE: DuNah, R., Harrington, C., Bedney, B., and Carillo, H., University of California, 1994.

**Figure 2**  
**Nursing Home Occupancy Rates, by State Opinion of Adequacy of Supply: 1993**



SOURCE: DuNah, R., Harrington, C., Bedney, B., and Canillo, H., University of California, 1994.

The situation in some other States is more complex than in the prior two examples. For example, Nevada had low bed ratios and a low average occupancy rate, whereas North Dakota had high bed ratios and a high average occupancy rate. In other States, the opinions of officials are not consistent with the ratios of beds and occupancy rates. One example is New York, which has the highest reported occupancy rate of any State (99 percent), and yet officials did not rate the State as having an undersupply of beds. The official opinion about adequacy of bed supply may be based on whether or not a State is willing to allow for the expansion of beds, rather than measures of population ratios or occupancy rates.

Although the relationship between occupancy and bed ratios is complex, they are correlated. As would be expected, occupancy rates are inversely correlated with bed ratios ( $r = -.40, p < 0.01$ ). An opinion of oversupply was given a value of 3, adequate supply was given a value of 2, and undersupply a value of 1. A logit regression analysis was conducted to determine the joint effect of bed ratios and occupancy rates on the official opinion of the adequacy of supply (for the 39 States with complete data). The bed ratios (chi-square score for covariates was 7.55 with 2 df,  $p = 0.023$ ) and for occupancy rates (chi-square score for covariates was 6.8 with 2 df,  $p = 0.033$ ) showed that the relationships were significant.

## DISCUSSION

The NF industry continues to be of central importance as a provider of LTC. The demand for NF services has increased with the growth in the aged population. The growth in NF beds shows a slow but steady increase across the States from 1978 to 1993. Although the bed growth rate was steady, it did not keep pace with the

increase in the population 85 years of age or over during the 16-year period.

This article examined the issue of whether the supply of NF beds was adequate by examining the ratio of beds per population, occupancy rates, and opinions of State officials. Although this article cannot reach conclusions about the adequacy of supply, these measures allow for comparisons across States. These data suggest that some States may have an oversupply of beds, while others appear to have an undersupply.

An oversupply of beds could increase the costs to the Medicaid program if the oversupply encouraged inappropriate placement of residents. On the other hand, an oversupply could allow for greater competition among facilities on a cost and/or quality basis. Having an oversupply, however, does not necessarily guarantee improved access to Medicaid recipients, depending on the State Medicaid reimbursement rate and the market. This appears to be less of a problem than having an undersupply of beds, where access to needed care might be denied. Future studies should use multiple factors to predict the need for NF beds which can be compared with the actual supply to address the question of which States may have an adequate supply or a supply problem.

Another major finding is the wide differences in the ratios of beds per aged population and occupancy rates across States and regions. The lowest ratios of beds per aged population occur in the West and the highest levels of beds occur in the North Central Region. The occupancy rates are highest in the Northeast, resulting in a potential access problem for those needing care. Where States have more beds available per aged population, they generally have lower occupancy rates.

A key research question is what explains the wide differences in the ratios of beds

per aged population and occupancy rates across States and regions. Many factors are probably associated with variations in growth rates, bed to population ratios, occupancy rates, and perceived adequacy of supply. Variations in the restrictiveness of State CON and moratorium policies designed to control bed stock are probably an important factor. A recent study showed that the number of years that States had a CON/moratorium in place was negatively correlated with the percent of bed growth and the ratio of beds per population 85 years of age or over and positively associated with State occupancy rates (Harrington, Curtis, and DuNah, 1994a).

Low State Medicaid NF rates can also have a critical effect on reducing the supply for nursing home services, which could also account for some of the variation in NF growth rates across States (Swan, Harrington, and Grant, 1993; Swan et al., 1993a). Low rates may reduce facility revenues, which can then impact negatively on the financial viability of NFs, and may reduce the general level of public and private investments made in new NFs and beds. Many other factors may directly affect the supply. Decisions to expand beds may be more likely to occur in areas where there is a large proportion of elderly, high growth in the elderly population, and/or high-income elderly groups (to allow for more private-paying patients). On the other hand, areas with high input prices, such as high capital construction costs, shortages in labor, and high labor costs may discourage NF growth. New studies of predictors of State variations are needed.

As previously noted, the considerable growth in home health care and other community-based services during the 1980s may be reducing the demand for NF care (Swan and Benjamin, 1990). The extent that the supply of alternatives varies across States and regions could influence the

growth of NFs. Those individuals who need LTC services now have greater choices because of the expanded capacity of community-based providers and expanded public funding for community-based waiver programs. Another factor may be the supply of residential-care beds, which can substitute for NF beds. These residential-care beds are more prevalent in the Western regions of the United States (Harrington et al., 1994). These alternatives may act as direct substitutes for care in conjunction with informal care services. Or perhaps, these alternatives have grown in certain geographical regions in response to the limited availability of NF services in those areas. The relationship of community-based LTC alternatives to the supply and demand of NFs and beds needs to be examined.

More important, there is a need to study the effects of the variation in bed capacity on the access, cost, and quality of NF services for individual nursing home residents and subpopulations of residents or applicants (minorities, Medicaid recipients, and the near-poor). If wide variations in medical practice patterns have negative consequences for some patients, it is also likely that the variations in State NF capacity have measurable negative consequences for some residents or groups of residents.

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